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A HANDY TYPE OF OVIPOSITION CAGE

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The cage shown in the accompanying photograph was devised by the writer as an oviposition cage for Oriental peach moths, and for this purpose proved to be very satisfactory. It has also been used with codling moths and strawberry leaf-rollers, and probably could be used with many other insects.

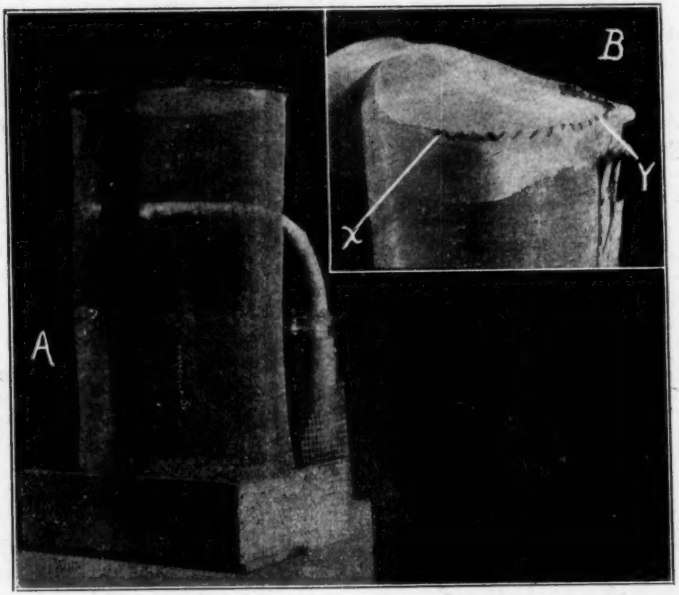

Fig. 1.A—Zipper oviposition cage; B—showing the method of fitting the top.

The chief point of interest in this cage is the strip of Lightening Fastener which allows for rapid opening and closing. Moths can be placed in the cage with an ordinary insect "sucker", or with a phial, by opening the fastener an inch or two. The operator may, if necessary, put his arm into the cage, and to prevent the escape of specimens, run the fastener up tight with his other hand and thus practically close the opening.

The cage proper is made of galvanized wire screening (18 mesh), and is fitted into a box three inches deep and of the same diameter as the cage. The wire extends to the bottom of box, (which forms the bottom of the cage), and is securely fastened to the sides. The box is filled with sand which can be kept moist if desired.

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The model shown in fig 1, is one and one-half feet high and has a diameter of nine inches. The strip of fastener itself is one foot long and five-eights of an inch wide, and is securely sewn with strong cotton thread to the bent back edges of an opening in the wire an inch wide. This opening is about ten and one-half inches long and the fastener is so placed that its upper end extends an inch beyond the top of the opening. This makes a moth proof connection.

Any type of top may be used, but the writer has found the type illustrated to be particularily strong and serviceable. Some cages thus fitted have lasted four seasons on an open-air insectary. Such a top has the advantage that no surface is offered the moths on which to lay eggs. This is a decided advantage when accurate oviposition experiments are being conducted.

Figs. 1B and 2, illustrate the various stages in fitting the top. Briefly the method is as follows: First cut out a circle of wire screening about four inches wider than the cage and on this (using white chalk or a soft red pencil) mark a circle having a diameter exactly one inch longer than the diameter of the cage. Pinch the wire back all around this circle. A somewhat warped, lid-like bit of wire will result which in cross section will look somewhat like the diagram in fig. 2 at x.

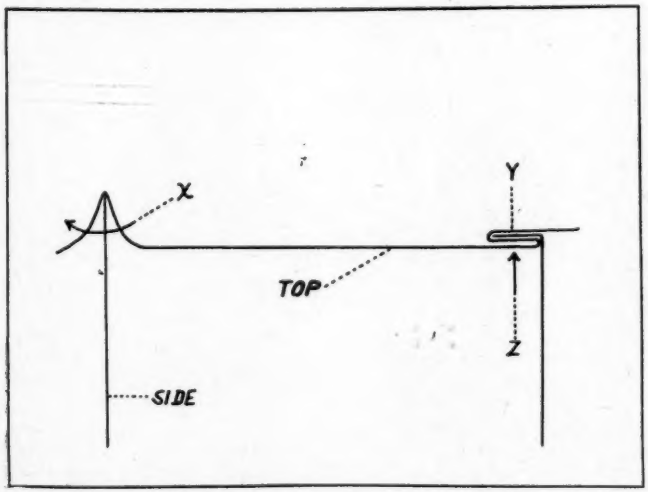

Fig. 2. Diagram showing method of fitting top.

Next fit the top down onto the cage as shown in figs. 1B and 2—pinch the bent portion of the top in against the side at X, and using strong cotton thread, sew with "over-hand" stitches through the three thickness of wire (as indicated by the arrow at X) so that the thread will pass through the wire screen side about three-eights of an inch from its upper edge. After the sewing is completed all around the circumference, bend the sewn portion inward as shown in figs. 1B and 2 at Y. It is necessary to bend the wire well over and inward here to get a sharp angle on the bent bit of the side. Next turn the

cage upside down on a smooth surface and, using a piece of wood a couple of feet long, tap all around the circumference as indicated by the arrow at Z in fig. 2. This pinches the joint securely and smooths out the buckles which usually occur during the bending of the wire. Complete the process by trimming off the rough edges of the top. Added rigidity will be given to the cage if when trimming the top, about half an inch of wire is left projecting at right angle to the cage as shown to the right of Y in figs. 1B and 2.

An outside water bottle with a strip of dental cotton (fig. 1A) proved to be a handy way of supplying the moths with moisture and at the same time eliminated the danger of drowning. If thoroughly soaked first the cotton wick will stay moist all summer provided that water is kept in the bottle.

Any suitable material on which to obtain eggs may be introduced into the cage. The flexibility of the whole cage allows for the opening to be stretched so that even when a one-foot strip of fastener is used, a flower-pot or other container six inches in diameter may be put in through the opening. For Oriental peach moth work the writer fastened leafy peach shoots directly to the west side of the cage and obtained as many as ten thousand eggs per day from one cage in a mass rearing experiment.

Strips of Lightning Fastener can be purchased in any desired lengths for about thirty cents a foot from the manufacturers in St. Catharines, Ont., or Meadville, Penn.

NEW NORTH AMERICAN AGROMYZIDAE (DIPT.)

BY S. W. FROST,
Pennsylvania State College, Arendtsville, Pa.

Three new species of *Agromyza* (*Liriomyza, Dizygomyza* and *Agromyza* of European workers) are presented herewith. Some of the material has been in the writers possession for a long time awaiting description. The Holotypes will eventually be deposited in the U. S. National Museum.

Agromyza baptisiae n. sp.

A small species less than 1.5 mm. Male: Front, face, cheeks, proboscis and scutellum largely yellow, palpi yellow slightly infuscated at the tips, occiput black continuous with the black of the ocellar triangle, oral margin and edges of cheeks very narrowly marked with shining black, yellow of cheeks not extending back of eyes, cheeks nearly one quarter eye height, a single pair of rather strong oral vibrissae distinctly stronger than accompanying setae along the lower edge of the cheeks, front including orbits nearly eye width distinctly narrowed below, four fronto-orbital bristles, the two lower pairs approximated in their rows, orbits pale shining brown, orbital hairs sparse but conspicuous, ocellar setae nearly equal in size to orbital setae, several minute hairs on ocellar triangle between ocellar setae, antennae black, third segment of medium size and rounded at the tips, arista black nearly bare two and a half times the length of the third antennal segment. Mesonotum shining black, four pairs of dorso-central bristles the anterior pair scarcely discernible from the acrostichals, about four irregular rows of acrostichals scarcely reaching to the posterior pair of dorsocentrals, upper parts of pleura rather broadly yellow, the yellow extending on anterior callosities and below the wing base but not above the wing base, verticle suture distinctly yellow, scutellum entirely

yellow in the center darkened along the sides, 1 strong pre-sutural, 1 mesopleural, 1 propleural bristle, intraalars weak. Abdomen subshining brown, first segment narrowly yellow along the anterior margin. Legs subshining brown, anterior knees narrowly yellow, tibiae without posterior bristles, tarsi slightly paler. Wings hyaline, veins dark brown, auxiliary vein indistinct ending independently in the costa, costa reaching to the fourth vein, discal cell rather small, anterior cross vein near the center of the discal cell, posterior cross vein slightly more than its length from the anterior cross vein, distal section of the fifth vein about one and a half times as long as the penultimate section, sixth vein scarcely reaching one half way to the wing margin, cross veins not parallel, second third and fourth sections of costa as 3-1-1, wings slightly pointed, squamae small, gray with dusky fringe. Halteres pale yellow.

Holotype; ♂, Arendtsville, Pa. August 1, 1927, reared as a leaf-miner from *Baptisia tinctoria* (L) R.Br.

Paratypes; Five specimens, also from Arendtsville Pa., June 9 to Aug. 3, 1927, 1929, 1930.

Runs close to *interfrontalis* Mel.

Agromyza cinereifrons n. sp.

A medium sized species about 2 mm. Male: Front, face and cheeks entirely cinereous dark brown, front nearly as wide as either eye, sides nearly parallel, orbits and frontal stripe concolorous opaque, cheeks narrow, behind less than one quarter of the eye height, a single pair of oral vibrissae distinctly stronger than accompanying setae along the lower side of the cheeks, occiput dark brown or black slightly dusted, Ocellar triangle black, frontal lunule extending halfway to ocellar triangle, slightly pollinose, proboscis yellow, palpi slender and black, four pairs of fronto-orbital bristles placed near the inner margin of the orbits, oral hairs minute and sparse a single row chiefly along the upper edge of the orbits, basal segments of the antennae brown, third segment black slightly broader than long rounded at tip, arista brown about three times as long as the third antennal segment thickened on the basal third, minutely pubescent. Mesonotum brown heavily dusted, four pairs of dorso-central bristles, anterior pair scarcely discernible from acrostichals, six or seven rows of acrostichals and about three rows of small setae outside dorso-centrals, the pair of setae between posterior dorso-centrals small scarcely discernible from acrostichals, pleura chiefly brown lightly dusted only horizontal suture and base of wing narrowly yellow, scutellum cinereous brown, four scutellar bristles about equal in size. Abdomen subshining brown. Legs brown subshining, tibiae and tarsi lighter brown, only anterior knees narrowly yellow, mid tibiae with posterior bristle about two thirds the way to the tip. Wings hyaline, auxiliary vein separated from vein one and ending independently in the costa, costa reaching to vein four, anterior and posterior cross veins not parallel, anterior cross vein near the middle of the discal cell, posterior cross vein about one and a half times its length from the anterior cross vein, last section of fifth vein about one and a quarter times the length of the penultimate section, squamae and fringe white. Halteres yellow.

Holotype; ♂ July 7, 1917, Florida, N. Y. Also four paratypes the same date and locality.

This species runs close to *angulata* Loew but differs in having front entirely cinerous and a bristle on mid tibia.

Agromyza viridis n. sp.

A medium sized species about 2.5 mm. Female: Head and legs largely shining black, mesonotum and abdomen distinctly shining green. Front, face, cheeks and occiput shining black, palpi and antennae black, proboscis brown, frontal stripe and orbits concolorous shiny black, lunule highly arched reaching more than half way up front and almost to ocellar triangle, four fronto-orbital bristles the upper three pairs approximated in their rows the lower pair more widely separated, orbital hairs long distinct and arranged in a single row reaching to the lower fronto-orbital, ocellar triangle scarcely distinguishable from the front, numerous minute setae between the ocellar setae on ocellar triangle, cheeks scarcely wider in front than behind, about one quarter eye height, a single pair of strong oral vibrissae with few or no other setae along the lower margin of the cheeks, palpi somewhat spatulate, third antennal joint medium size rounded at tip sparsely covered with dusky pubescence, arista brown thickened on basal third tapering gradually to the tip, nearly bare and about two and a half times as long as the third antennal segment, eyes nearly bare (in male eyes minutely but distinctly hairy above) a carina between antennae. Mesonotum and scutellum shining green in color, pleura entirely brown or black with a greenish luster, two pairs of dorso-central bristles, the posterior pair stronger, acrostichals fine and numerous about seven or eight rows reaching to or slightly beyond the posterior pair of dorso-centrals, three or four rows of small setae outside dorso-centrals, pair of setae between posterior dorso-centrals absent, presutural bristles unusually far to the sides of the mesonotum, 1 strong intraalar on each side of the mesonotum, four scutellar bristles of about equal size. Abdomen shining green. Legs entirely dark brown or black with a greenish sheen, mid tibiae with posterior bristle near middle. Wings hyaline, auxiliary vein ending in vein one, costa extending to fourth vein, anterior cross vein distinctly beyond the middle of the discal cell, posterior cross vein nearly straight about its length from the anterior cross vein, last section of the fifth vein about three quarters the length of the penultimate section, sixth vein terminating suddenly about one third the distance from the wing margin, squamae and fringe entirely white. Halteres brown, with a distinct white spot on inner side of knob.

Holotype: ♀, Bakersfield, Kern Co., California, Sept. 23, 1930, bred from Zinnia.

Paratypes, three males and two females, also from Zinnia, Bakersfield, California. Sept. 22 to Sept. 24, 1930. 2 ♂, same locality Sept. 23, 1930, 5 ♀, Sept. 27, 1930.

This species runs close to *cupatoriae* Mall and *virens* Mall. It differs in having the front narrower and shining black and the thorax and abdomen more shining green.

ON COLOR DIMORPHISM IN PODALONIA VIOLACEIPENNIS (LEP.). (HYM.:SPHECINI).

BY H. T. FERNALD,
Orlando, Fla.

In a paper on "The Digger Wasps of the Genus Podalonia (Psammophila)" (Proc. U. S. Nat. Mus., Vol. 71, p. 25, 1927) the writer ended a discussion of the possibility that *Podalonia luctuosa* Sm. is only a differently colored *P. violaceipennis* (Lep.) with the statement: "On the whole it seems best to leave *luctuosa* as a species separate from *violaceipennis*, for the present, until more pairs have been captured and the evidence they may give becomes available."

In brief, *P. luctuosa*, found in Nova Scotia, the different Canadian provinces, New England, the most northern states, the Rocky Mountain states, from Montana to New Mexico, and on the Pacific coast, but at the higher altitudes in the more southern of these states, is known only by females with one exception, a tiny, black male taken at Troublesome, Col., 7345 ft. alt., June 9, 1908 by Mr. S. A. Rohwer. As nearly 500 specimens have now been examined, the absence of males is perplexing.

Podalonia violaceipennis (Lep.) is our most common species of the genus, having been taken practically everywhere *P. luctuosa* occurs, and also in the more central and southern states (see maps, idem, pp. 23 and 34). In this species both sexes have the abdomen more or less ferruginous.

The presence in the U. S. National Museum collection of a pair, taken at Placer Lake, Cal., the male of which is *P. violaceipennis* while the female is *P. luctuosa*, first suggested the possibility of color differences in the female, and the situation was discussed in the paper already referred to, closing with the statement quoted above.

Since then, two observations bearing on the subject have been made and are most significant. In June, 1928, Mr. Walter Carter at Twin Falls, Idaho, (*in lit.*) "noticed some *P. luctuosa* females digging nests. I put out plant pot baits filled with sand and succeeded in getting three or four cocoons. I was delighted later to have a male emerge. * * * I am sending you the specimen under separate cover. The label date should read—Twin Falls, Idaho, June, 1928. I was much interested to note that this male has red on the abdomen."

This specimen, upon examination, proved to be without question, a male *P. violaceipennis*.

Dr. J. Bequaert of the Harvard University Medical School "captured a mated pair of *Podolonia*, the female of which was entirely black, while the abdomen of the male was partly ferrugineous." (Bull. Brooklyn Ent. Soc., Vol. xxiv, No. 4, pp. 220-221, 1929.). This pair was captured near Bayfield, La Plata Co., (9000 ft.) Colorado, in July, 1928. The male Dr. Bequaert identified as *P. violaceipennis* and the female as *P. luctuosa*.

The two mated pairs and the male *violaceipennis* raised from a female *luctuosa* would seem to prove conclusively that *luctuosa* is only a color variety of *violaceipennis*, most often found in northern or elevated regions and that the male is sometimes, though very rarely, affected in the same way. *Luctuosa* as

a specific name will therefore become a synonym and be used only in referring to the wholly black color variety.

A somewhat similar color variation in the European species, *Podalonia hirsuta* (Scop.) has been discussed by Kohl and was referred to by myself (l.c., p. 25), and also by Dr. Bequaert.

TWO GENERA OF BEES NEW TO THE RECORDED FAUNA OF NOVA SCOTIA

BY T. D. A. COCKERELL,
Boulder, Colorado

The following bees, obtained by Professor Brittain of Macdonald College, are of more than ordinary interest and should be recorded.

Triepeolus brittaini n. sp.

Length about 8 mm., robust, the pubescent markings white, very faintly creamy on abdomen; antennae, mandibles, tegulae, tubercles and legs black except that the tegulae have an obscure brownish spot on outer margin, and the small joints of tarsi (but not the basitarsi) are ferruginous; eyes greyish green; face densely covered with silvery-white hair; third antennal joint shorter than fourth, with an obscure red spot beneath; margin of prothorax and tubercles, and mesopleura densely covered with white hair; mesothorax densely punctured, anteriorly with four widely separated short bands of greyish-white hair, not conspicuous, the lateral ones adjacent to the tegulae, and represented also by a spot behind each tegula, the median ones parallel, not reaching anterior margin, the distance between them greater than the length of one; axillar prominent; scutellum bilobed; area of metathorax dull; wings greyish-hyaline, stigma and nervures black; second cubital cell large, almost triangular, receiving recurrent nervure about middle; spurs black; first tergite with basal declivity covered with white hair, which extends right across, but is a little notched in middle; apical band of first tergite rather widely interrupted in middle, broadened at sides, but the lateral extensions based small and shaped like the end of a finger; thus the black area on this tergite is a broad strictly transverse band; second tergite with band very narrowly interrupted, broadened at sides, the anterior margin of the band laterally evenly curved, not at all angulate; tergites 3 to 6 with entire bands; apical plate coarsely punctate, quite broad; second and third sternites with broad bands of greyish-white hair, broadened in middle and curved at sides, third and fourth with fringes, more or less dark in middle, fifth with tegument reddened at sides, and a shining apical mark.

Nova Scotia, King's County, July 31, 1930, at *Epilobium* (W. H. Brittain, 405). The type will be placed in the Canadian National Collection.

Related to *T. banksi* Ckll. from Virginia, but with much narrower, slightly yellowish abdominal bands, the lateral portions on the first two tergites quite different. The axillae are much less produced than in *T. banksi*. In Robertson's Illinois table it runs nearest to *T. donatus* (Fabr), a considerably larger species, with the white tomentum on first tergite broadly continuous at sides.

Macropis morsei Robertson

Nova Scotia, Halifax Co., July 30, 1930, both sexes at *Lysimachia*.

PAUROPODA FROM ALASKA AND THE YUKON

BY WILLIAM A. HILTON
Department of Zoology, Pomona College, Calif.,

I have not found any records of this group of animals from Alaska or indeed from so far north. In the summer of 1930 I searched many localities throughout this region for these and similar animals of similar habitat. I did not find a single specimen of the insect genus *Campodea* or *Japyx*. I did not find the larger *Symphyla* at any time but a number of these small Pauropoda were found in five widely separated places. Two genera of the group were collected with three species in one and one in the other. Although there were some similarities between these four species and others collected to the southward, all were distinct.

Stylopauropus alaskensis n. sp.

Length .9 mm., width .066 mm. at its narrowest. The total length of the antenna is .1715 mm. of which the base is .06 mm. The shorter globus flagellum is .034 mm. long, the longer is .038 mm. long. The long flagellum of the other branch is .1115 mm. long. The globulus branch of the antenna is heavier than the other. Its total length is .02975 of which the globulus itself is one third. The eye areas are quite large, .04675 mm. long by .017 mm. wide. Nothing unusual was discovered in the distribution of the dorsal setae. The head at its forward end bears four spatulate setae in the center and three longer more pointed hairs on each side of these. The last segment bears two large caudolateral hairs and a pair of central spines on either side of the central caudal spine which is made of two very closely placed spines.

The long sensory setae have the last hair the longest or .1715 mm. long or the length of the antennae. The next hair to this is .1015 mm. long. The first hair was .068 mm. long but evidently broken at the end. The legs are as follows: The first leg is .119 mm. long. The second leg is .115 mm. The other legs further back were .1715 mm. long. The joints of the first leg beginning with the shortest joint are 1-3-2-4-5. The joints of the second leg are 1-5-3-4-2-6. The last legs were broken at their tips in the type but the next to the last had the joints as follows, 1-5-2-4-3-6.

The legs have sharp pointed but rather broad claws. There is a simple flattened hair on each of the two basal joints of the first eight legs. On the last leg the two first joints of the leg each have a thick hair which has a smaller lateral branch.

The distinctive features of the species are the small caudal appendages, the arrangement of the frontal hairs of the head, the character of the claws and the basal hairs of the legs.

In some respects these are near *S. oregonensis* described from Mt. Hood some months ago. In this last species the parts of the central caudal hairs are less close and the lateral hairs are smaller. *Material.* Several specimens from Skagway, Alaska. These and the type in the Pomona College collection.

Stylopauropus dawsoni n. sp.

Length .85 mm., length of head .114 mm., width .133 mm. The first segment of the body is .076 mm. long and .152 mm. wide. The second seg-

ment is .161 mm. long by .209 mm. wide. The third is .19 mm. long by .266 wide. The fourth body division is .285 mm. long by .304 mm. wide. The fifth body division is .221 mm. by .266 mm. wide. The sixth is .266 long by .152 wide. The total length of the antennae is .3 mm., the basal region is .066 mm. The longest flagellum is .114 mm. The next longest flagellum is .076 mm. and the shortest flagellum is the same length as the globulus stalk of .028 mm. The long flagellum is on its separate branch while the other two are on the globulus branch. The basal segment of the globulus branch is two thirds as long as the other basal segment of the long flagellum and twice as thick. It also bears a hair about as long as the globulus stalk.

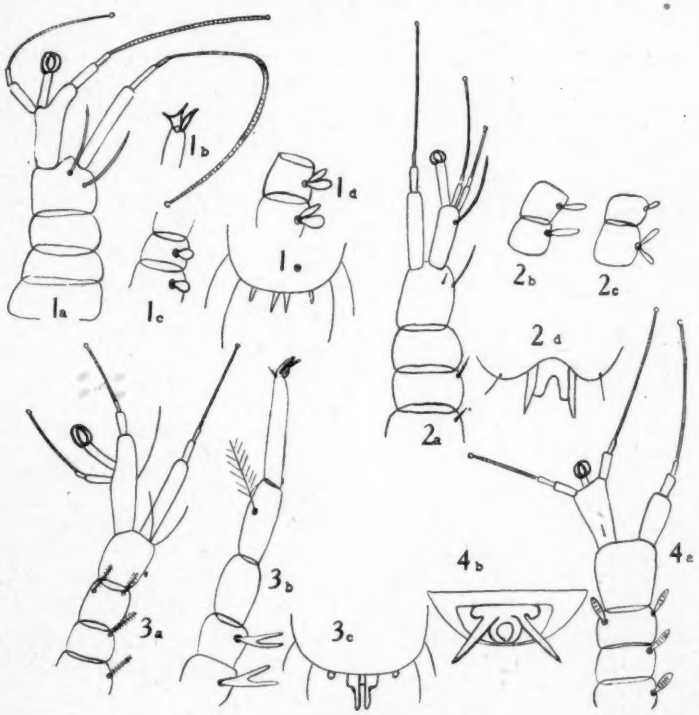

Fig. 1. *Stylopauropus alaskensis* n. sp. a) Antenna. b) Claws of front legs. c) Basal segments of the first leg. d) Basal segments of the last leg. e) tip of the abdomen.
Fig. 2. *Stylopauropus dawsoni* n. sp. a) Antenna. b) Basal joints of the first pair of legs. c) Basal joints of the last pair of legs. d) Caudal end of the body.
Fig. 3. *Stylopauropus globulus* n. sp. a) Antenna. b) Last leg. c) Caudal end of the abdomen.
Fig. 4. *Pauropus arctus* n. sp. a) Antenna. b) Caudal end of abdomen.

The globulus is about one fourth the length of its stalk. The four basal segments of the antennae bear several short hairs. The eye areas are elliptical in outline and almost half as long as the head.

The distribution of setae is as follows:

There are two short and two longer somewhat club-shaped hairs between the eye areas. Back of each eye there is a hair and four hairs are

located on the back part of the head. The first division of the body has two pairs of anterior hairs and a like number at the caudal margin. The second body division above has a row of four hairs and two on each lateral margin. The hairs here and some other places are short clubs. The next segment above has three lateral hairs on each side. The next has about five pairs of hairs, one cephalic pair, one caudal pair and two lateral pairs. The next segment is about the same. The last division of the body above has four caudal hairs.

There were no unusual features noted in the long sense hairs.

The caudal plate is composed of two double spines, the inner branch of each is truncate, the outer, pointed.

The legs in length are as follows: the first is .0935. The second is .1275 mm. The third is the same. The fourth is .53 mm. The fifth and sixth are .153. The seventh is .204. The eighth is .36 mm. and the last is also .204.

The lengths of the joints beginning with the shortest are; 5-4-2-3-1. The second leg; 5-1-2-3-4-6. The third is the same as are the next three. The rest of the legs are; 1-2-3-5-4-6.

The claws are simple and short. The setae are flattened on the basal joints of the legs. There are club-shaped hairs one for each joint on the first to the fifth leg. The sixth leg has a double or branched hair on the basal joint but a single hair on the next joint. The same condition is found on the remaining legs.

The distinguishing characters for the species are found in the caudal end of the animal and in the peculiar distribution of the basal spines of the legs.

Material and *locality*. The type is one of about ten collected just back of Dawson, Y. T., about one third of the way up Midnight Dome.

Stylopauropus globulus n. sp.

Length .6 mm. The head is .057 mm. long. The first division of the body is .114 mm. long, the next two .19 mm., the next .266. The next division of the body is .299 mm. long. The last division is .152 mm. long and the next to the last is .19 mm. long.

The total length of the antenna is .266 mm. Its base is .076 mm. All three flagella are of about the same length. The two basal segments for these last are of about the same length but the one bearing the globulus is thicker. The globulus is borne on a stalk twice as long as globulus itself.

The eye areas each are .038 mm. wide by .076 mm. long.

The distribution of setae is as follows:

The head bears short spatulate hairs, about eight on a side. The first dorsal division of the body about four hairs, dorsally, and two or three prominent ventral ones. The second division bears about 12 slender hairs in two groups. The next division of the body is similar above. The next bears about six in a cephalic group and 10 in a caudal group. The last divisions have one or two pairs of dorsal hair each.

The caudal end has the anal plate with central and lateral globular appendages of small size.

The legs. In lengths they are as follows; first, .199 mm., second, .228, third .23 mm., fourth, .266, fifth and sixth, .266, seventh, .287, eighth, .342. ninth, .47 mm. The proportions of the leg joints are as follows beginning with the shortest joint; first leg, 1-3-4-2-5. Second, 5-1-3-4-2-6. Third leg, 1-5-3-2-4-6. Fourth leg, 5-1-2-3-4-6. Fifth leg, 5-1-2-3-4-6. Sixth leg, 1-5-3-2-4-6. Seventh leg, 5-1-2-3-4-6. Eighth leg, 1-5-(2, 3, 4)-6. Ninth leg, 1-2-(3, 4)-5.

There are small simple spines on the two basal segments of legs one to eight. On legs 4 and 5 they are larger than the first three legs and more spatulate. On legs 6 to 8 they are twice as long or in this case .019 mm. long. The last leg bears on each joint a double spine or a forked spine .05 mm. long.

The distinctive features of this species are the anal plate with the globules either side of it, the distribution of the hairs on the basal segments of the legs and the general character of the antennae. These seem near to the species *S. locatus* described from near Claremont, Calif., but they have the globulus on a much longer stalk and there are globular appendages in the caudal region of the Alaska species.

Location and *material*. Besides the type in the Pomona College collection there were several other specimens all collected at Currie, Alaska.

Pauropus arctus n. sp.

Length 1 mm. The head is a little longer than the first body region. The proportions of the body segments are usual. The total length of the antennae is .181 mm. The four basal segments are .0595 mm. long. The segment basal to the long flagellum is .02975 mm. Its total length with its basal joint is .125 mm. The basal joint to the globulus branch is .03825 mm. The total length of this branch with the basal joint is .12 mm. The longer flagellum of this branch is .09725. The shorter flagellum of this branch is .05 mm. long. The globulus itself is on a very short stalk and its total length is .017 mm. The basal segments bear several clavate striped hairs.

Dorsally and laterally the head bears club-shaped hairs about twenty in all on the dorsal side. The eye areas are .02975 mm. wide by .05975 mm. long.

The first dorsal plate bears two pairs of hairs, the second 3 pairs, the third six pairs, the fourth five.

The lengths of the legs are as follows: first, .10, the second and third the same, the fourth .1095, the fifth, .1175 mm., the sixth, .119, the seventh and eighth .1445 and the last .2465 mm. The proportions of the leg joints are as follows; beginning with the shortest joint; first leg, 1-4-2-3-5, second 1-2-5-4-3-6. Other legs are similar to the last until the seventh which is 5-1-2-3-4-6. The eighth is similar and the ninth is 1-2-4-3-5.

The two basal joints of the first legs have each a broad hair. On the first basal joint of the sixth leg the spine is sharply curved. On the seventh and eighth legs the spines on the two basal joints are longer and straight. On the two basal joints of the last leg the basal hairs are larger and double. These are three times as large as the similar simple spines on the basal segments of the first pair of legs.

The caudal plate is peculiar and distinctive as shown in the figures.

Material and *locality*. The type just described is a male in the Pomona College collection. The type and several other specimens were collected at Eagle, Alaska, about a mile south of the river in woodland.

A NEW SPECIES OF PHYSOCEPHALA FROM ONTARIO, CANADA. (CONOPIDAE, DIPTERA)

BY M. C. VAN DUZEE,
Buffalo, N. Y.

Physocephala lucida n. sp.

Male: Length 11 mm. Occiput and vertex black; front yellow with a shallow black triangle at vertex, the black extending in a rather narrow stripe to base of antennae, where it is slightly forked; face yellow, cheeks black, this black extending up about to the depressed grooves of the face, which are less yellow and more shining than the rest of the face and somewhat more whitish; lower ends of posterior orbits very narrowly reddish; antennae blackish with first and third joints more or less reddish; style short and thick, third joint somewhat pointed at tip, second joint with a large projection on the side; length of antennal joints about as 15-67-38, of style as 9; proboscis blackish, a little more than twice as long as head.

Dorsum of thorax and the metanotum dull black, narrow posterior margin of the dorsum of thorax reddish; a spot of white pollen inside of each humerus; pleura dark reddish with the elevated portions more black; no pollinose pleural stripe. Abdomen black, somewhat shining, last three segments a little dulled with coarse gray pollen; posterior margins of first four segments narrowly white pollinose; venter and apical half of second segment reddish.

Feet and legs dark reddish or reddish brown, apical half of all femora a little blackish; base of all tibiae yellow, base of tarsi reddish or yellowish; outer surface of hind coxae and upper apical surface of fore and middle tibiae with a depressed, white pollinose space.

Wings blackish from costa back to fifth vein, except towards apex of wing, the cell in front of first vein pale brownish; the black fills the first posterior cell, except a small brownish gray space in front of the last section of fourth vein; discal cell clear from a considerable distance in front of the anterior cross-vein, except a narrow space in front of fifth vein, which is blackish; second posterior cell wholly dark grayish; last section of fourth vein more than one and a half times as long as preceding section; peticle of first posterior cell and the posterior cross-vein of nearly equal length; last section of fifth vein three fourths as long as posterior cross-vein.

Described from two males, taken at Gull Lake, Ontario; holotype during last half of July and the paratype on August third, 1918. Holotype in the author's collection.

This would run to *sororcula* Williston, (Mexico), in the table of species in the Proceedings of the California Academy of Sciences, fourth series, Vol. xvi, p. 583, couplet 6, but it differs in many respects from that species, in that the vertex is red, second joint of style slender, pollen more golden, and the abdomen opaque black.

SOME ERYTHRONEURA (GRAPE LEAF HOPPERS) OF THE MACULATA GROUP. (HOMOPTERA CICADELLIDAE)

BY R. H. BEAMER
Department of Entomology, University of Kansas, Lawrence, Kansas.

(continued from page 270)

25. **Erythroneura tantilla** n. sp.

General ground color yellowish white to semihyaline. Color markings red or orange. Vertex with semblance of white spots surrounded with red, heavier red spot on tip. Pronotum with median, rather small, triangular spot with U-shaped anterior margin and usual angular spots back of each eye. Scutellum with spot on tip, basal angles yellow with red dash on exterior margin of each anterior corner. Clavi with usual red basal anchor-shaped mark, often broken in middle, and quite long dash near tip. Coria with spot on costa midway between costal plaque and humeral angle, another at anterior end of plaque, one on Cu opposite middle of plaque, two at posterior end of it and another on Cu just before cross-veins. Cross-veins red. Small black spot in posterior end of costal plaque and larger one in base of cell M_4. Tips of tegmen slightly dusky. Red angulate vittae across anterior margin of face connecting with anterior spot of vertex. Remainder of venter stramineous more or less tinged with pink.

Genitalia. Pygofer hook single, with slight S curve, much widened on outer two-thirds, several rows of rather coarse, sharp teeth on this portion. Style with medium foot; base curved; heel small; anterior point short, not more than a third as long as posterior, less than right angle, projecting out; posterior point about as long as narrowest width of foot, outer margin almost straight, inner curved to meet that of base. Oedagus very short, narrow and straight with round tip. Shaft about two-thirds as long as foot.

Holotype; male, Anderson Co., Kans., Nov., 26, 1927; R. H. Beamer.

Paratypes; males from Kansas, Illinois and Iowa.

26. **Erythroneura interna** n. sp.

General ground color yellowish white to semihyaline. Color markings red to orange. Vertex with median oblong white spot and two smaller ones at base near each eye all surrounded by broad bands of color. Pronotum with broad spot on tip, basal angles yellow bordered with red or orange. Tegmen with heavier spots than usual. Clavi with large basal anchor and large spot just before tip. Coria with small spot on costal margin midway between costal plaque and base, zigzag vitta arising at anterior end of costal plaque crossing to claval suture between anchor and its other spot, thence back to posterior end of plaque, then angling to end just before base of cell M_4. Cross-veins more or less colored. Tips of tegmen more or less dusky. Small black spot in posterior end of costal plaque and larger one in base of M_4. Venter stramineous with more or less pink markings.

Genitalia. Pygofer hook of medium length, single, slightly curved for about half its length where it bends suddenly in at almost a right angle. Style with short foot; base evenly curved; heel small; anterior point short, less than right angle; posterior point short, forming sharper angle than anterior, extend-

ing slightly below base. Oedagus of medium length, almost straight and parallel sides.

Holotype; male, Cherokee Co., Kans., 1927, R. H. Beamer.

Paratypes; 4 males from Kansas and 2 males from Lacoochee, Fla., 1931, R. H. Beamer.

27. **Erythroneura dira** n. sp.

General ground color yellowish white to semihyaline. Vertex with three white spots surrounded by a semblance of red or orange bands. Pronotum with rather large almost heart-shaped median spot with semblance of anterior projections at each lateral corner. Usual spot back of each eye. Scutellum with orange spot on tip and basal angles yellow. Clavi with usual basal anchor-shaped spot and rectangular one near apex. Coria with spot on costa at humeral angle, an angular one at anterior end of costal plaque, two at posterior end, rectangular one opposite clear space in clavus and another just before base of cell M_4. Cross-veins red. Black spot in base of cell M_4, and sometimes in posterior end of plaque. Tips of tegmen more or less dusky. Venter stramineous often tinged with pink.

Genitalia. Pygofer hook single almost straight, thicker on basal third. Style with large foot; base straight; heel large; practically no anterior point; posterior point as long as foot or longer, quite narrow and almost parallel sided. Oedagus very short, almost square, with rounded projection anteriorly, more or less spiny.

Holotype; male, Leavenworth Co., Kans., April 28, 1928; R. H| Beamer.

Allotype; female, Marshall, Ark., March 21, 1931.

Paratypes; numerous males, from Kansas, Iowa, Oklahoma, Arkansas, Illinois and Maryland.

The almost square oedagus from dorsal or ventral view with the long posterior points and rather small straight pygofer hook are characteristic of this species.

28. **Erythroneura concisa** n. sp.

General ground color pearly white to semihyaline. Color markings red. Vertex with semblance of three white spots surrounded by red bands. Pronotum with median rather small triangular spot and usual angular spot back of each eye. Scutellum with tip red and very small angular spot in each outer corner. Clavi with usual basal anchor-shaped mark and rectangular spot just before tip. Coria with round spot on costal margin midway between costal plaque and base, an angular vitta at anterior end of costal plaque, blotch opposite middle of plaque and clear area of clavi, two spots at posterior end of costal plaque and a more or less U-shaped spot just before base of cell M_4. Cross-veins red. Tips of tegmen slightly dusky. Black spot in base of cell M_4. Venter stramineous tinged with pink.

Genitalia. Pygofer hook single, rather wide throughout, curving gently inward, with pronounced cleft on inner margin just before tip. Style with medium foot; base straight; heel medium; anterior point short and sharp; posterior point about one-third longer than foot, curved in toward tip, narrow with sides almost parallel. Oedagus very short, stout and rectangular, from an end view it has somewhat a bilobed appearance, covered with spines.

Holotype, male, Anderson Co., Kans., Nov., 26, 1927; R. H. Beamer.
Paratypes; two males, same data and others from Iowa, 1930.

29. **Erythroneura mensa** n. sp.

General ground color yellowish white to semihyaline. Color markings orange to red. Vertex with three white spots more or less surrounded by orange bands. Pronotum with median triangular spot nearer posterior than anterior margin, customary red or orange dash back of each eye. Scutellum with orange tip, basal angles yellow more or less surrounded with orange. Clavi with rather heavy anchor in basal half and another blotch just before tip. Coria with small dash half way to costal plaque, another at anterior end of plaque extending to claval suture between the anchor mark and other spot irregular-sided and growing larger as it proceeds, and another angular vitta arising at posterior end of plaque and ending near base of cell M_4. A small black spot in posterior end of costal plaque, larger one in base of cell M_4. Tips of tegmen more or less dusky. Venter stramineous, legs tinged with pink.

Genitalia. Pygofer hook single, of medium length, curved in almost to tip where it is enlarged and curved slightly out. Style with medium foot; base straight almost to posterior point where it is sharply notched; heel medium; anterior point short, slightly less than a right angle; posterior point longer, very sharp but not protruding much beyond base of foot. Oedagus very short, curved in lateral view, tip rounded, sides almost parallel.

Holotype, male, Anderson Co., Kans., Nov., 26, 1927, R. H. Beamer.
Paratypes; males, Kansas, Illinois and Iowa.

30. **Erythroneura arta** n. sp.

General ground color yellowish white to semihyaline. Color markings orange. Vertex with three yellowish white spots surrounded with broad orange circles, one median and two basal, apex with orange spot usually connected with orange that surrounds median white spot. Pronotum with median U-shaped mark, rather broad, often almost reaching anterior margin, usual triangular orange mark back of each eye. Scutellum with orange tip, basal angles yellow outlined on two sides at least with orange. Clavi with definite orange anchor and an elongate orange mark before tip. Coria with small spot near humeral angle, an irregular-sided dash arising at anterior end of costal plaque and ending before claval suture near anterior end of outer mark on clavi, another vitta arising near posterior end of plaque, widening, angling toward and ending just before base of cell M_4, often broken. Cross-veins orange. Black spot in posterior end of plaque and larger one in base of cell M_4. Venter stramineous with some pink markings. Tips of tegmina more or less dusky.

Genitalia. Pygofer hook single, rather heavy with well marked inner curve. Style with medium foot; base curved; heel large; practically no anterior point; posterior point slightly longer than half length of foot, about as wide as outer half, making slightly more than right angle with it. Oedagus of medium length, very wide in dorsal or ventral view, rounded tip, lateral edges with teeth.

Holotype; male, White Co., Ill., March 31, 1929, P. W. Oman.
Allotype; female, same data.

Paratypes; numerous males, from Ill., Kansas, Iowa, Oklahoma, Arkansas, Tennessee, Virginia and Maryland.

31. **Erythroneura rotunda** n. sp.

General ground color pearly white to hyaline. Vertex with semblance of three white spots more or less surrounded by red or orange bands. Pronotum with more or less V-shaped median spot, touching both margins, usually enclosing a white spot anteriorly. Usual angular red spot back of each eye. Scutellum with spot at tip and thin line of red on lateral margins. Clavi with usual anchor-shaped red mark in basal two thirds with a rectangular spot just before tip. Coria with spot on costal margin midway between humeral angle and plaque, one opposite plaque, another surrounding its anterior end, vittae on all longitudinal veins from posterior end of plaque to cross-veins. Cross-veins red. Black spot in base of cell M_4. Tips of tegmen slightly dusky. Venter stramineous, legs tinged with pink.

Genitalia. Pygofer hook single, two-thirds as long as style, straight, slightly thickening toward middle then narrowing evenly to sharp point. Style with short foot; base of foot straight; heel medium; anterior point short, sharp projecting out; posterior point one-third longer than foot, narrow, almost parallel-sided. Oedagus very short, in lateral view almost circular, very narrow from dorsal view.

Holotype; male, Johnson Co., Ill., March 30, 1929, P. W. Oman.

Paratypes; 5 males, Ill.; 2 males, Nashville, Tenn.; and 1 male from Plummer's Island, Maryland.

32. **Erythroneura abjecta** n. sp.

General ground color yellowish white to semihyaline. More yellow than most species. Color markings quite red. Vertex with semblance of three light spots more or less surrounded by red bands, anterior one connected with red cross-band of face. Pronotum with median V-shaped mark not usually connected with either margin. Usual red spots back of each eye. Scutellum with tip red, basal angles yellow bordered with red. Clavi with usual basal anchor-shaped mark, often broken in middle and rectangular one before tip. Coria with spot on costa midway between humeral angle and costal plaque, one at anterior end of plaque, one opposite middle of plaque, two at posterior end and more or less triangular one on mesal margin at tip of clavus. Cross-veins red, color following longitudinal veins in some cases. Tips of tegmen slightly dusky. Black spot in base of cell M_4. and a much smaller one in posterior end of costal plaque. Venter stramineous, more yellow than common. Red cross-band on face.

Genitalia. Pygofer hook single, stout, about half as long as pygofer, thicker near base with distinct outer curve in same region. Style with medium foot; base curved; heel large; anterior point short, less than right angle, projecting out; posterior point as long as foot, almost as wide as foot at toe, straight, almost parallel sided. Oedagus short, in lateral view almost straight, ending in round tip, base forming spine-like projection near base of shaft.

Holotype; male, Johnson Co., Ill., March 30, 1929, R. H. Beamer.

Paratypes; four males, Wabash Co., Ill., March 31, 1929, R. H. Beamer.

33. **Erythroneura externa** n. sp.

General ground color yellowish white to semihyaline. Characterized by bright red median line of spots, one each on vertex pronotum, scutellum and near tip of clavi. Vertex with median large red spot containing two white dots. Large shield-shaped red spot on disc of pronotum containing three more or less rectangular white spots in its anterior border. Usual yellow angular spots back of each eye. Middle portion of scutellum also red and containing white rectangular spot in anterior margin. Clavi with yellow or lighter red basal anchor-shaped spot and oblong bright red spot just before tip. Coria with spot on costa midway between costal plaque and humeral angle, another at anterior end of plaque, one opposite middle, another at posterior end and one just before base of cell M_4. All of these marks much lighter in color. Cross-veins yellowish. Tips of tegmen more or less dusky. Venter stramineous.

Genitalia. Pygofer hook single, narrow, bent outward in almost a U-curve. Style with small foot; base curved; heel small; anterior point short, less than right angle; posterior point about as long as heel, sharper than anterior. Oedagus of medium length straight in any view.

Holotype; male, Anderson Co., Nov. 6, 1929, R. H. Beamer.

Allotype and one female paratype, same data.

Paratype; one male, Cherokee Co., Kansas, R. H. Beamer.

This species may be separated from *accola* McA. by the much larger bright red spot on disc of pronotum and by the outward curving pygofer hook.

(to be continued)

A SYNOPTIC REVISION OF THE GENERIC CLASSIFICATION OF THE CHELONETHID FAMILY CHELIFERIDAE SIMON. (ARACHNIDA)

BY JOSEPH CONRAD CHAMBERLIN,
Twin Falls, Idaho

The following synoptic revision of the family Cheliferidae is presented at this time in order to render available for routine systematic use the expanded classification of this important family necessitated by recent morphologieal and systematic research. It follows along the lines already laid down by the author in previous papers on the higher classification of the Chelonethida as a whole (Chamberlin, 1929, 1930 and 1931) and differs only in the fact that consideration of included species is omitted in all but a few special cases. Specific revisions of the various genera will be prepared and published from time to time in the future as opportunity permits, both as such and in connection with ordinary faunistic reports.

The terminology employed is that previously elucidated and illustrated by the writer (Chamberlin, 1931 etc.). Literature citations throughout the text refer to the terminal bibliography.

Family **Cheliferidae** Hagen

1878. Cheliferidae (pars). Hagen, p. 400.
1879. Cheliferidae (pars). Simon, p. 18.
1906. Cheliferidae (pars). With, p. 115.
1908. Cheliferinae (pars). With, p. 217.
1931. Cheliferidae. Chamberlin. (In press.)

Diagnosis. Monosphyronid, cheliferoid false scorpions in which the intrafemoral articulation of legs I and II strongly differs morphologically from that of legs III and IV. Chela without accessory teeth and with the venom apparatus developed in both fixed and mobile fingers. Flagellum of chelicera with three to five blades, generally with either three or four.

Remarks. Two subfamilies are herein recognized. This division is both natural and useful in spite of the fact that primary and secondary sexual characters must largely be relied upon to define them.

Subfamily WITHIINAE nov.

Orthotype. The genus *Withius* Kew.

Diagnosis. Femoral articulation of legs I and II nearly vertical and of only limited mobility except in *Philomaoria* where the articulation is typically cheliferoid. Males with specialized sternal bristle-bearing areas except in *Philomaoria* which, however, is characterized by an abundant supply of loosely clustered microlyrifissures especially on the last sternite. Female with vestitural setae of genital operculum loosely clustered, not arranged in definite linear sub-lateral rows. Genital sacs of male reduced and never developed as ramshorn organs; coxal sacs invariably lacking. Foreclaws of tarsus of male symmetrically developed; tarsal claws and subterminal setae single. Male genital structures generally largely membranous and simple in structure compared to those of the Cheliferinae (see: Chamberlin, 1931). Flagellum of four blades with the exception of *Afrowithius* which possesses five.

Remarks. The genera here recognized are of very unequal systematic value and hence, for the purpose of taxonomically equalizing the discrepancy, three tribal categories are tentatively recognized. The included tribes and genera are characterized in the following key.

DIAGNOSTIC KEY TO THE TRIBES AND GENERA OF THE SUBFAMILY WITHIINAE.

1. Carapacal, tergal, and palpal setae elongate and either simple or terminally denticulo-acuminate; seta IT distad of EST; male without the usual characteristic sternal bristle patches; last sternite markedly hispidously granulate ..... (*Philomaorini* trib. nov.) *Philomaoria* gen. nov.
   Carapacal, tergal, and palpal setae thickened or variously clavate but never acuminate; seta IT proximad of EST; mature male with more or less prominently developed patches of microsetae on at least a few of the sternal segments; eleventh sternite smooth or at most tesselate 2
2. First three to six tergites entire or almost so; tergites heavily sclerotic and sharply defined from the intersegmental and interscutal membranes; divided tergites with the suture linear but sharply defined; first six to eight tergites roughly serrate along their posterior margin; males with sternal bristle patches on segments 8 and 9, vestigial on 6 and 7; indistinct tergal crests (morphologically unlike the tergal crests of the Cheliferinae) present in mature males; dorsal sclerites and pedipalps coarsely granulate; vestitural setae clavate; eye-spots only present ..... (*Cacodemonini* trib. nov.) ..... *Cacodemonius* gen. nov.
   All but first and last tergites longitudinally divided (first tergite frequently divided in addition) sclerotization of tergites not as in *Cacodemonus*, the

scutae merging imperceptably into the membranous portions so that the posterior margins are not, and morphologically cannot be, serrate; males with sternal bristle patches variously disposed; in almost all cases adult males do not show tergal crests; dorsal sclerites and palps granulate or squamosely tesselate; with true eyes or eye-spots) .....(*Withiini* trib. nov.) 3

3. Carapace broadest across its posterior margin, converging slightly but continuously anteriorly; tactile seta of tarsus IV subterminal in position (¾ tarsal length removed from base of tarsus); (male with bristle patches developed on segments 7-9 inclusive).....*Parawithius* gen. nov.
Carapace not as in *Parawithius;* tactile seta of tarsus IV more nearly median than in *Parawithius* (½ to $^2/_3$ tarsal length removed from base of tarsus)..4

4. Carapace with sides sub-parallel, as wide at anterior furrow as along posterior border; (males with bristles patches on segments 4 to 9 or 4 to 10 inclusive; with true eyes) 5
Carapace broadest at anterior furrow or slightly anterior thereto, sides converging abruptly in front and gradually to the rear; (eyes or eye-spots present; sternal bristle patches as in first part of couplet or otherwise).....6

5. Flagellum of five blades; male with weak but distinct tergal crests .....
.....*Afrowithius* gen. nov.
Flagellum with the normal four blades; male without tergal crests .....
..... *Withius* Kew

6. Eye-spots only present; inter-scutal bristle areas not present; sternal bristle areas of adult male of normal type, occurring on segments 4-9 or 4-10 inclusive; palpal form typical, not excessively attenuate ..*Metawithius* gen. nov.
True eyes present, bristle areas of adult male interscutal in position and occurring in various combinations on segments 7-9; palps excessively slender and elongate, quite atypical in general appearance..*Dolichowithius* gen. nov.

Philomaorini tribus nov.

Orthotype. The genus *Philomaoria* nov.

Diagnosis and remarks. Characterized in the preceding key. It includes at present only the monotypic type genus.

Philomaoria gen. nov.

Orthotype. Philomaoria nova-zealandica sp. nov.

Diagnosis and remarks. Characterized and differentiated from its relatives in the preceding key. Its only included species is from New Zealand. The true systematic position of this aberrant genus is perhaps doubtful and its association with the Withiinae is mostly on the basis of negative criteria, that is, it lacks those characteristics which would positively associate it with the highly distinctive Cheliferinae without at the same time possessing those characteristics most typically Withiine.

Philomaoria nova-zealandica sp. nov.

Holotype, ♂, (JC-518.01001); allotype, ♀, (JC-518.01002); paratypes, ♂ & ♀, (JC-518.01002-26). Taken at New Brighton, New Zealand by "Captain Hutton." Collections of the British Museum

Diagnosis. Carapace almost twice as long as broad; anterior furrow distinct and only slightly posterior to median; posterior furrow indistinct, nearer posterior margin than anterior furrow; eyes marginal, and less than their di-

ameter from the anterior carapacal margin; chaetotaxy (14-8) 75 to 80; with scattered microlyrifissures. All tergites except first and eleventh longitudinally divided; tergal chaetotaxy somewhat variable but showing in general a discal as well as marginal series of setae; the first three tergites of male and first two of female bear only the usual marginal series of 6-8 setae, the remainder of the tergites with from 4-6 setae in the discal and 6-8 in the marginal row of setae, averging perhaps more in the female than in the male. Sternal chaetotaxy similar except that the discal row of setae is represented by only a pair of lateral setae, while the margin series comprises between 18 and 24 setae. Palps of normal slender type showing no aberration in general form; chela distinctly broader than deep in both sexes; trochanter with a gentle rounded protuberance behind, 1.9 times as long as broad; femur subequal to tibia in length and 2.8-2.9 times as long as broad; tibia longer than hand and 2.4-2.5 times as long as broad; fingers distinctly shorter than hand; chela 2.5-2.6 times as long as broad. Marginal teeth of fixed finger of chela number about 37, anteriorly conical and prominent but becoming blunt and less distinct posteriorly; movable finger with 37-40 similar teeth. Basal seta of chelicera dentate; sub-basal seta present. Fixed finger of chelicera with 5 to 6 retrorse marginal teeth; serrula interior with three dentate subapical lobes and the usual dentate terminal process; serrula exterior with 28-31 ligulate teeth; subapical lobe of movable finger typical. Length 4.0-5.5 mm.

Cacodemonini tribus nov.

Orthotype. The genus *Cacodemonius* nov.

Diagnosis and remarks. Characterized and differentiated from its relatives in the preceding key. Includes at present only the type genus.

Cacodemonius gen. nov.

Orthotype. Withius cactorum J. C. Chamberlin (Chamberlin, 1923, p. 377.)

Diagnosis and remarks. Characterized in the key. In addition to the orthotype it also includes *Chelifer satanas* With (With, 1908, p. 245) and *Chelifer segmentidentatus* Balzan (Balzan, 1890, p. 428; With, 1908, p. 242). The orthotype is Mexican, the other two South American.

Withiini tribus nov.

Orthotype. The genus *Withius* Kew.

Diagnosis and remarks. Characterized in the key.

The females of the included genera of this tribe are all rather similar morphologically and adult males are almost necessary, in doubtful cases, for the correct placing of a given species. The disadvantage and general undesirability of recognizing generic groups on the basis of sexual characters, especially those of a single sex, is clearly recognized but it seems difficult if not impossible to avoid in the present instance. It is believed, however, that when more abundant material comes to hand this difficulty can be largely overcome through a detailed comparative study of the female.

Parawithius gen. nov.

Orthotype. Chelifer nobilis With. (With, 1908, p. 234.)

Diagnosis and remarks. Characterized and differentiated from its relatives in the key. The orthotype is South American as are *Chelifer rufus* Balzan (Balzan, 1890, p. 431; With, 1908, p. 231) and *Chelifer proximus* Ellingsen

(Ellingsen, 905, p. 324; With, 1908, p. 231) which also seem to pertain to this genus.

Afrowithius gen. nov.

Orthotype. Chelifer (Withius) paradoxus Ellingsen. (Ellingsen, 1912, p. 98.)

Diagnosis and remarks. Characterized and differentiated from its relatives in the key. The orthotype is South African.

Withius Kew

1911. *Withius* (Subgenus of the Chelifer). Kew, p. 49.
1923. *Withius* Kew. Chamberlin, p. 376.

Orthotype. Chelifer subruber Simon. (Simon, 1879, p. 30; With, 1906, p. 155.)

Diagnosis and remarks. Characterized in the key. This seems to be the largest as well as the central genus of the tribe. Apparently the following species belong here: *Chelifer (Chelanops) lagunae* Moles (Moles, 1924, p. 42), which is possibly a synonym of *W. subruber,* from California; *Chelifer hispanus* L. Koch (L. Koch, 1873, p. 26), from Southern Europe; *Withius vagrans* Chamberlin (Chamberlin, 1925, p. 332), from Texas. *Chelifer simoni* Balzan (Balzan, 1891, p. 591) is referred here with some doubt. The orthotype itself is nearly cosmopolitan in its general distribution, probably as a result of commerce.

Metawithius gen. nov.

Orthotype. Chelifer murrayi Pocock. (Pocock, 1900, p. 156; With, 1906, p. 159.)

Diagnosis and remarks. Characterized and differentiated from its relatives in the key. The orthotype is from India.

Dolichowithius gen. nov.

Orthotype. Chelifer longichelifer Balzan. (Balzan, 1890, p. 433; With, 1908, p. 238.)

Diagnosis and remarks. Characterized and differentiated from its relatives in the key. In addition to the orthotype the genus includes *Chelifer canestrinii* Balzan (Balzan, 1890, p. 430; With, 1908, p. 236). Both species are South American.

Subfamily CHELIFERINAE Simon

1879. Cheliferinae (pars). Simon, p. 19.
1906. Cheliferinae (pars). With, p. 116.
1908. Cheliferinae (pars). With, p. 217.

Orthotype. The genus *Chelifer* Geoffroy.

Diagnosis. Femoral articulation of legs I and II oblique and freely mobile. Males without the specialized sternal bristle patches of the *Withiinae.* Vestitural setae of genital operculum of female arranged, in part at least, in distinct sub-lateral rows. Genital sacs of male (with one rare exception) strongly developed and voluntarily extrusible as the "ramshorn organs" of sexual display. Coxal sacs almost invariably present. Foreclaws of male always more or less asymmetrically developed. Tarsal claws and subterminal setae frequently cleft. Male genital structures more complex and more heavily sclerotic than in the Withiinae. The flagellum comprises three blades in all species known me.

Remarks. I recognize two tribes and about a dozen genera as properly pertaining to the subfamily as here restricted. Sexual differentiation, insofar as the false scorpions are concerned, reaches its maximum in this subfamily and as a consequence primary and secondary sexual characters are employed throughout in defining the genera. For this reason separate keys are given for each sex. In doubtful cases the generic status of a given form can only be ascertained with certainty upon the basis of an adult male. For purely practical reasons the tribal categories are not discriminated in the following key to the genera.

(to be continued)

BOOK NOTICE

The Arachnid Order Chelonethida. By Joseph Conrad Chamberlin Ph. D. 284 pp., 71 figs. Stanford University Publications, Biological Sciences, Vol. VII, No. 1, Aug. 1931.

This volume is an attempt to present in an adequately illustrated manner an exposition of our present knowledge of the comparative external anatomy of the Chelonethida (Pseudoscorpionida) and to base upon this a new systematic arrangement of the order. Using the family as a unit of comparison the author devotes the initial 196 pages to a study of the important sclerites of the pseudoscorpion body. Attention is given to the function as well as the form of these morphological units and to their inter-relationships as parts of the whole.

The remainder of the volume deals with a systematic treatment of the order. Using the morphological bases defined in the foregoing section the author recognizes the order to consist of eighteen families. No attempt is made to deal with species except as they are representative of higher groups but wherever possible subfamilies and genera are defined in keys under their families, and a reference appended to the most recent treatment of the genus in question.

The work concludes with a selected bibliography of 311 titles and a general index to the principal topics discussed in the text. G. S. W.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1931

The sixty-eighth Annual Meeting of the Entomological Society of Ontario was held at the Ontario Agricultural College, Guelph, on Thursday, Friday and Saturday, November 19th, 20th and 21st, 1931.

The morning and afternoon sessions were devoted to the reading and discussion of papers. At the evening meeting, held in Memorial Hall, Dr. J. D. Detwiler, President of the Society, acted as Chairman, Dr. R. Harcourt, Professor of Chemistry at the College, welcomed the members and visitors, and Dr. F. E. Lutz of the American Museum of Natural History delivered an extremely interesting lecture on "Our Ignorance Concerning Insects". Miss Pollard of MacDonald Hall and Miss McCarthy of the College Staff contributed vocal and violin solos which added greatly to the enjoyment of the evening.

On Thursday evening a smoker was held in the Faculty Club Room, Memorial Hall. At this gathering the members were entertained with musical numbers rendered by a number of the college students.

During the course of the meetings the following papers were presented:—

"Some Notes on the Cyclamen Mite Tarsonemus pallidus Banks; a Pest of Strawberry Plants"—A. G. Dustan and W. G. Matthewman, Entomological Laboratory, Ottawa.

"The Orange Tortrix, Tortrix citrana Fern—a Greenhouse Pest in British Columbia"—Arthur Gibson, Dominion Entomologist, Entomological Branch, Ottawa.

"The Black Vine Weevil Brachyrhinus sulcatus Fab. Causing Injury to Strawberry Plantations in New Brunswick"—R. P. Gorham, Entomological Laboratory, Fredericton, New Brunswick.

"The Black Vine Weevil Brachyrhinus sulcatus Fab. attacking Japanese Yew"—R. W. Thompson, Ontario Agricultural College, Guelph, Ont.

"The History of the Oriental Peach Moth in the Niagara Peninsula"—W. A. Ross, Entomological Laboratory, Vineland Station, Ontario.

"Chrysopids as a Factor in the Natural Control of the Oriental Peach Moth"—W. L. Putman, Ontario Agricultural College, Guelph, Ontario.

"Notes on the Grape Berry Moth"—W. G. Garlick, Entomological Laboratory, Vineland Station, Ontario.

"Control Measures for Apple-Tree Borers"—R. Hutson, Michigan State Agricultural College, Lansing, Michigan.

"An Observation on the Trapping of Apple Maggot Flies"—J. Marshall, Entomological Laboratory, Annapolis Royal, Nova Scotia.

"Some Notes on the Apple and Thorn Skeletonizer Simaethis pariana Clerk"—L. Caesar, Ontario Agricultural College, Guelph, Ontario.

"The Status of Lubricating Oil Sprays in Ontario"—W. A. Ross, Entomological Laboratory, Vineland Station, Ontario.

"Some Entomological Interceptions on Imported Nursery Stock"—R. W. Sheppard, Plant Inspection Office, Niagara Falls, Ontario.

"Notes on the Brown-headed Spruce Sawfly Pachynematus ocreatus Harrington"—A. V. Mitchener, Manitoba Agricultural College, Winnipeg, Manitoba.

"Dreyfusia (Adelges) picae Ratz. and its Relation to "Gout" Disease in Balsam Fir"—R. E. Balch, Entomological Laboratory, Fredericton, New Brunswick.

"Colonization of Collyria calcitrator in Western Canada"—C. W. Smith, Entomological Laboratory, Belleville, Ontario.

"Further Studies upon the Parasites of the Oriental Fruit Moth in Ontario"—W. E. Steenburgh, Entomological Laboratory, Belleville, Ontario.

"Some Apparatus Developed in Connection with Parasite Work"—A. B. Baird and G. Wishart, Entomological Laboratory, Belleville, Ontario.

"Observations on the Outbreak of Sod Webworm During the Season 1931"—G. M. Stirrett and A. Arnott, Entomological Laboratory, Chatham, Ontario.

"Notes on the Potato Stem Borer Gortyna (Hydroecia) micacea Esp."—R. P. Gorham, Entomological Laboratory, Fredericton, New Brunswick.

"Some Experiments with Temperature, Moisture and Their Effect on Diseases of Red-backed Cutworm"—H. L. Seamans and R. W. Salt, Entomological Laboratory, Lethbridge, Alberta.

"A Co-operative Quantitative Investigation of the Relation between Summer-Fallow Methods and the Wireworms in Saskatchewan; a Progress Report"—K. M. King, University of Saskatchewan, Saskatoon, Sask.

"Notes on Life-History of Euxoa detersa Wlk."—H. F. Hudson, Entomological Laboratory, Strathroy, Ontario.

"Observations on the Outbreak of the Green Clover Worm attacking Beans during the Season 1931"—G. M. Stirrett, Entomological Laboratory, Chatham, Ontario.

"The Correlation of Sunspot Periodicity with Grasshopper Fluctuations in Manitoba"—N. Criddle, Entomological Laboratory, Treesbank, Man.

"The Sugar-beet Nematode: Observations on its First Appearance in Canada"—G. M. Stirrett, Entomological Laboratory, Chatham, Ontario and R. H. Painter, Entomological Branch, Ottawa, Ontario.

"Notes on the Onion Maggot Hylemyia antiqua Meigen"—E. W. Kendall, Jr., Ontario Agricultural College, Guelph, Ontario.

"Notes on Taeniothrips gladioli Moulton and Steinweden"—A. G. Dustan, Entomological Branch, Ottawa, Ontario.

"Notes on Control Substances for Sowbugs"—R. W. Thompson, Ontario Agricultural College, Guelph, Ontario.

"European Corn Borer Situation in Ontario in 1931"—L. Caesar, Ontario Agricultural College, Guelph, Ontario.

"Notes on Some of the More Injurious Insects of the Season 1931 in Canada":

Nova Scotia ..... Mr. F. C. Gilliatt

New Brunswick	Mr. R. P. Gorham
Quebec	Mr. G. Maheux and Mr. C. E. Petch
Ontario	Prof. L. Caesar and Mr. W. A. Ross
Manitoba	Prof. A. V. Mitchener and Mr. N. Criddle
Saskatchewan	Mr. K. M. King
Northern Alberta	Prof. E. H. Strickland
Southern Alberta	Mr. H. L. Seamans
British Columbia	Mr. E. R. Buckell

"Collecting Among the Snow Peaks of Vancouver Island"—J. B. Thompson, Victoria, British Columbia.

"A Preliminary Report on the Effect of Precipitation on the Emergence of Cephus cinctus Nort" G. F. Manson, Entomological Branch. Ottawa.

"Recent Observations on the Behaviour of Wohlfahrtia vigil Walk."—Dr. Norma Ford, University of Toronto, Toronto, Ontario.

"Notes on Certain Myiasis—Producing Diptera"—A. A. Kingscote, Ontario Veterinary College, Guelph, Ontario.

"The Occurrence of the Moose, or Winter, Tick in the Maritime Provinces in 1931"—R. P. Gorham, Entomological Laboratory, Fredericton, New Brunswick.

"Local Variations in the Habits of Hypoderma lineatum Villers and Hypoderma bovis De Geer of Significance in Regard to Control Measures"—A. A. Kingscote, Ontario Veterinary College, Guelph, Ontario.

"The Temperature Gradient of a Stream and its Effect on the Insect Fauna"—Fred P. Ide, University of Toronto, Toronto, Ontario.

"The Mouth Parts of Beetles of the genus Nemognatha"—G. J. Spencer, University of British Columbia, Vancouver, British Columbia.

"The effect upon the Insect Head Capsule of Changes in the Position of the Mouthparts"—E. M. Walker, University of Toronto, Toronto, Ont.

"The Uses of Cellulose Nitrate in Exhibition Work"—A. A. Wood, Entomological Laboratory, Strathroy, Ontario.

"Variations within the species of the Nemestrinid Fly Rhyncocephalus sackeni Williston"—K. Graham, University of British Columbia, Vancouver, British Columbia.

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